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## ORIGINAL ARTICLES.

### PARALYSIS AND PARESIS OF THE MUSCLE OF ACCOMMODATION.\*

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(*Continued from last issue.*)

THE affection may be unilateral, but as a rule it is bilateral. The paresis occurs very often when the nervous manifestations are pronounced or marked muscular enfeeblement follows convalescence. Iris complications may be absent and usually are very slight if present at all. This paresis or paralysis may be a part of a more extensive ophthalmoplegia<sup>60</sup>, either interna or externa. If so, then brain symptoms are invariably noted. The prognosis ordinarily is very favorable.

### DIPHTHERIA<sup>61</sup>.

A very large quatum of accommodation interference is furnished by diphtheria. The severity of the diphtheria bears no relation to the frequency or severity of the paresis. Mild

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<sup>60</sup>Uhthoff. (Deut. Med. Wochschr. No. 10, 1890). U. cites a case of ophthalmoplegia interna. Gayet (Jahr. f. Aug. 1876) cites a case of total ophthalmoplegia externa, without implication of the levator palpebrae superioris. Guttman. Loco citato.

<sup>61</sup>The largest statistics on this point are furnished by Moll and Remak (v. special ref.).

attacks often are followed by the most protracted forms of paralysis. The young and the middle-aged share alike. Frequently pharyngeal and laryngeal pareses accompany the other. It generally makes its appearance when full convalescence has been established. The onset is usually sudden; the attack continues from ten days to two or three weeks. Recovery is the invariable rule, and this without specific medication.

It is often a valuable diagnostic point in doubtful cases of diphtheria. The infection must have been diphtheritic, to the contrary notwithstanding, when it follows a sore throat. No angina<sup>62</sup> produces a similar paresis or paralysis. It is not necessary to have the classical diphtheria in order to get this complication. A diphtheritic wound anywhere can give rise to it.

Some very peculiar cases are recorded in this particular<sup>63</sup>. If the accommodation interference is associated with absence of patellar reflex, tabes may be very closely simulated<sup>64</sup>. The attack is usually bilateral, though unilateral<sup>65</sup> and <sup>3a</sup> cases are on record (often accompanied by other symptoms).

The introduction of antitoxine did not abate the frequency of post-diphtheritic paralysis as was hoped<sup>66</sup>. The administration of it for the paralysis is as good as useless<sup>67</sup>. It does not cut the attack short, nor does it transfer a paralysis into a paresis, as was thought at one time. Behring never took this complication into consideration when he was experimenting with the serum. There is no reason why he should have, as the prognosis is at all times absolutely favorable. But one fact is evident, namely since the serum, the post-diphtheritic

<sup>62</sup>Bass. *Monat. f. Augheilk.*, 1886, p. 273. A case due to mumps (?) and sore throat.

<sup>63</sup>Gayton, W. In the *London Lancet* describes a case of post-diphtheritic accommodation paralysis following genital diphtheria (v. special ref.)

<sup>64</sup>Jessop, H. W. V. special ref. The only case on record.

<sup>65</sup>Dufour. He cites a case of monocular diplopia following diphtheria. It must have been of the myopathic type and involving only a part of the muscle. (v. special ref.).

<sup>3a</sup>. Wolfe. He says "both eyes are rarely affected" (1882). The statistics of Moll and Remak do not uphold him. (v. special ref.).

<sup>66</sup>Janowski (v. ref.). "Die Kranken werden jetzt die Laehmungen wohl oeffters erleben als vor der Serumperiode und dementsprechend wird also die absolute Zahl derselben seit Einfuehrung letzterer steigen."

<sup>67</sup>Hertel and Graefe (v. special ref.) both maintain this idea and cite cases in support of their view.

paralyses are more frequent. Statistics, however, seem divided on this score. Schmidt-Rimpler holds that the antitoxine hastens the return of the accommodation. This has not been the observation of others nor of the writer.

Rosenmeyer<sup>68</sup> and Boerger<sup>69</sup> in a large series of cases say that the serum has reduced the number of paralyses. Perhaps if the serum were given in the very outset of the disease and not on the third or fourth day as is so common, the number of paralyses might be less. The delay gives the toxins a chance to become disseminated and a severe attack is not needed for a production of these pareses. St. Bernheimer inclines to the view that the serum has a beneficial influence on the paralysis. The paresis may cause a persistent asthenopia, though it never remains permanent<sup>70</sup>.

The diphtheritic paralysis is a peripheral one<sup>71</sup>. Hensen and Voelckers place the lesion in the nerve endings. Knies<sup>72</sup> says it cannot be a hemorrhage or a terminal nerve inflammation but some toxin which directly affects the ciliary muscle. This belief is now accepted by quite a few clinicians<sup>73</sup>.

#### HYSTERIA<sup>74</sup>.

In hysteria a spasm of the accommodation is more often seen than a paralysis. Charcot and Parinaud have recorded unilateral diplopia as due to a paresis or a paralysis of the muscle of accommodation. Micropsia is very often complained of in this condition while it is rare in the other forms of paralysis. Here, too, the mydriasis is apt to be unequal. Children furnish the largest quota of cases, and in them it

<sup>68</sup>Rosenmeyer. *Wien. med. Wochenschr.*, 1886, No. 13 and 14.

<sup>69</sup>Boerger. *Ueber 100 Faele von Diphtherie mit Serum behandelt*, *Deut. med. Wochenschr.*, 1895, No. 52.

<sup>70</sup>St. Bernheimer. *Aetiologie u. path. Anatomie d. Augenmuskellahmungen*; Graefe-Saemisch *Handb. d. gesam. Augenheild.*, bd. VIII, S. 16-80, 2te. Ausgabe.

<sup>71</sup>In the days of Donders (1860) and Nagel (1866), they did not know whether it was a peripheral or central lesion. For them unilateral paralysis confirmed peripheral, and bilateral paralysis, central lesions. This is obviously incorrect.

<sup>72</sup>*Trans. of Ophthal. Soc. U. of K.*, vol. vi, 386.

<sup>73</sup>This view coincides with those of Randolph; *Amer. Med. Sc.*, Nov., 1902.

<sup>74</sup>Donders speaks of this condition as "painful accommodation."

(a). Foerster designates it as "hysterical kopiopia."

(b). Nagel calls it "hyperaesthetic ciliary muscle."

is the first symptom of a general hysterical manifestation. Perhaps spasm and paralysis are of like frequency, the former in the nervous and the latter in the plethoric type of hysteria. So long as the far and near point are not coincident, the patient will enjoy fair vision. This depends a great deal upon the static refraction of the eyes. Very few hysterical patients ever escape without accommodation interference. Parinaud holds that paralysis is rare in hysteria, though Galezowski and others have the opposite view. Both are right in a measure.

#### GENERAL DISEASES.

In the greater majority of cases it is a paresis rather than a paralysis. Many of the infectious diseases as typhoid, malaria, pneumonia, scarlet fever, measles, whooping cough, neurasthenia (Grand-clement), scorbutus (Bristowe), and multiple neuritis (Oppenheim) develop a paresis either during the attack or directly upon convalescence. The cause here is the general muscular enfeeblement that usually accompanies these diseases. We can regard the most of these cases as a paresis due to exhaustion of the ciliary muscle, hence myopathic, and not as a motor oculi nerve interference, and therefore not a true paralysis. No doubt the toxins which circulate in the system as a result of the disease play no minor role in producing these pareses.

The implication of the ciliary muscle in this class of cases is of the milder variety, and a rather rapid recovery follows the toning up of the general muscular system. These patients complain of a severe accommodative asthenopia. In fact, it so closely resembles this, that many a pair of glasses is prescribed, which would not have been necessary had the patient had the proper care and attention immediately following the sickness. It is simply to avoid this ciliary paresis that we prohibit the patients from reading or using their eyes very much during any protracted illness.

Many of the anaemias (as chlorosis, simple anaemia, and leukaemia,) are prone to have some accommodation trouble and usually it is a paresis of the ciliary muscle; this is particularly true in chlorosis. Much suffering could be spared the chlorotic if the physician would but recognize this point. A proper correction will relieve the trouble, allow the ciliary

muscle to recuperate; and, upon the cure of the chlorosis, the glasses are in most cases not needed.

Rheumatism, gout and dysentery lay claim to quite a few cases of ciliary paresis. Even the involvement of the accessory sinuses of the nose are responsible at times for a paresis of the ciliary muscle.

Strange, that tuberculosis with all its disseminating tendencies seldom causes a paresis, excepting that which may be due to muscular feebleness. There are many more diseases in which we may have this ciliary muscle implication, but the ones mentioned will suffice. The writer did not intend to dwell at all upon purely nuclear or orbital lesions, though reference has been made thereto.

In general it may be stated that a peripheral paresis and paralysis develops slowly as compared with the nuclear type. This serves as a point in differential diagnosis at times. Again, in the peripheral varieties mydriasis is often wanting, while it usually accompanies the nuclear. In many instances where toxins are concerned it seems as if they exhibited selective tendencies. One cause for the frequency of this selection, perhaps, can be ascribed to the fact that the ciliary muscle and its nerve supply have a highly differentiated organ. No doubt in the autotoxic type, though the lesion is frequently peripheral, yet the nucleus may be slightly involved. The same may be said of the purely toxic type.

By far the majority of the cases are peripheral paresis or paralysis, as only the act of accommodation is involved. If more than this is involved the chances are that we are dealing with some central or orbital lesion. Sufficient proof, however, has been given to show that the loss of accommodation can, at times, be a purely nuclear lesion without involving any of the other functions of the eye. Enough has been said to caution us not to neglect this apparent simple symptom in arriving at our diagnosis in such cases where little signs are of importance.

#### TREATMENT.

Little remains to be said about this. The indications are very obvious, namely, treat the underlying cause. For, a paresis or a paralysis of the ciliary muscle does not develop as such, but, whether peripheral or central, it has an under-



lying factor. The palliative treatment is the use of suitably adjusted lenses. The prescribing of eserine or strychnia may do some good, but the writer believes it is only apparent.

In general it may be said that the peripheral types offer better prognoses than the nuclear or central variety. The only caution to observe is not to mistake an asthenopia for a paresis or a paralysis.

The toxins of the various infectious diseases act on the peripheral mechanism of accommodation in much the same manner as the mydriatics or miotics. Finally, from what has been said, we notice that paresis or paralysis of the ciliary muscle as a peripheral symptom is quite common.

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<sup>4</sup>Voelckers. Ibidem.

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#### DISCUSSION.

DR. D. S. REYNOLDS, Louisville, Ky.—I regard this as one of the most important papers I have ever heard read. It opens up for discussion a many-sided question that has at times great clinical significance. Without undertaking to look into the theories discussed by the essayist, I wish to say that I regret he had overlooked the fact that some people have the voluntary power of controlling the pupillary motion and the accommodative function. Roget, of London, whose Treatise on Physiology was published in 1838, was able to dilate his pupil at will and control the exercise of the accommodation. He could go on reading the finest type and dilate the pupil widely or contract it at will. Benj. Travers, a distinguished ophthalmic surgeon of London, published a letter from Dr. Roget, in a Treatise on Ophthalmic Surgery, published in 1820-4, before the time the Physiology of Roget was published.

I am obliged to take issue with Dr. Suker when he says that, in the paralysis of accommodation in diphtheritic cases, the prognosis is always favorable. I know of more than one case of paralysis of accommodation occurring in the course of diphtheritic disease that has remained persistently for years, and it has not disappeared. I know an instance more than 20 years old; I mean it is more than 20 years since the diphtheria occurred in a child of ten. Of course it may be argued that the diphtheritic poison was not the sole cause of the paralysis, and it would be difficult to refute the argument, that other causes may have existed, but the fact remains, as tending to show that, the prognosis is not always favorable.

I have seen two persons, with congenital absence of the iris; in one there is no accommodative power, and in the other normal range of accommodation exists. These are not to be forgotten

nor overlooked. There are other cases in which absence of the function of accommodation exists, and which cannot be certainly accounted for.

I am very grateful to Dr. Suker for the time and care he has displayed in the preparation of this paper.

DR. ADOLF ALT, St. Louis.—While Dr. Reynolds mentions the fact that he has seen cases in which diphtheritic paralysis of the accommodation did not get better, I think the case he mentions as example was not an uncomplicated diphtheritic paralysis but probably some other disease was combined with the diphtheria. I have never seen such a paralysis that did not get well in the course of a number of weeks.

I beg to differ from Dr. Suker in his opinion that none but diphtheritic sore throats cause paralysis of accommodation. I have the records of a number of cases in which the bacteriological examination, the symptoms and the history of the case did not prove diphtheria, and in which a few weeks later paralysis of the accommodation occurred. I am satisfied that there are some infections of the tonsils and fauces that may cause paralysis of the accommodation which are not purely diphtheritic, or so little so that it is not possible to find the bacteriologic evidence and which, nevertheless, cause accommodative paralysis.

The Doctor recommends as treatment, palliative glasses. I do not see why we should give them. The accommodation assumes day by day a little more strength, and after a few days, you will have to get another glass, and at no time will it be of much value. I believe that the child who has diphtheritic paralysis should be carefully looked after, for fear of more important pareses and paralyses supervening. I have the children abstain from eye work and do not allow them to go back to school as the family physician frequently does. I tell the parents to watch them very carefully, and especially not to let them run about. Sometimes to make them more comfortable I contract the muscle of accommodation by using eserine and usually give *nux vomica* or some such nerve stimulant.

DR. FRED. C. HOTZ, Chicago.—While listening to Dr. Suker's paper I was struck by the different tendencies that to-day two essayists have presented. Dr. Alt tried to separate two distinct pathological conditions which so frequently have traveled together. He showed that there is one group of episcleral inflam-

mation in which the nodules appear upon the episclera, and another class of cases in which diffuse infiltration was present. If that distinction would be adopted, I think a good deal of discussion as to the merits and demerits of the treatment would be eliminated.

On the other hand, it seems to me, if I caught the drift of Dr. Suker's paper rightly, he applies the term of paresis and paralysis to a number of cases or conditions in which it is not proper. He speaks of paresis of the accommodation following diseases that exhaust the system—typhoid fever and others. It is true that after an exhaustive disease most people cannot use their eyes for close work very long; if they are presbyopes, not at all; but the question is, is it proper to speak of such conditions as paralysis? Paresis means simply a low grade of paralysis. Those people are unable to keep their eyes converged very long. I suppose we should speak of insufficient converging power. Paralysis, if I understand the term right, refers to the nerve—to a reduced or limited supply of nerve force to the muscle. After such diseases the nerve is all right, it seems to me. It is the muscle which cannot act under the same nerve stimulus. The muscles cannot maintain the work required of them with the nerve force applied. These people cannot walk very long either, but certainly no one speaks of their legs being paralyzed or parietic; and that is the point I want to bring out, that this paper would lead you to speak of paralysis or paresis of accommodation under conditions where no such thing has existed.

DR. ADOLF ALT, St. Louis.—It has just occurred to me that I forgot that I wanted to refer to those cases in which there is a congenital insufficiency of accommodation. Here the muscle of accommodation is not sufficiently strong to do the full work required of it. Such cases surely would come under a separate class, and cannot be spoken of as parietic or paralytic cases, although their range of accommodation is smaller than it should be. These cases I think the author of the paper did not refer to.

DR. THOMAS FAITH, Chicago.—The doctor makes the statement that contraction of the pupil and accommodation are not associated actions, and while this may be true in a certain limited number of cases, it is not the case in the average normal eye, and our modern text books of physiology teach that they are associated actions.

Another point is the statement that the differential diagnosis between paresis and other affections of the accommodation can be made by taking the range of accommodation. This I do not believe, as the range of accommodation differs so much in the same individual at different times and in different individuals at the same time.

DR. WM. E. GAMBLE, Chicago.—The question of drugs producing paresis of accommodation has not been dwelt upon. I have lately had an experience which emphasizes the importance of the careful exclusion of drugs as an etiologic factor. A man came to me with paralysis of accommodation which had existed for several weeks. I went over the case carefully without finding any cause for the trouble. I, however, discovered he had been taking a drug for some weeks and asked him to return and bring to me his prescription. This showed that he had taken 1-96 of a grain of hydrobromate of hyocin every two hours. I advised him to discontinue it and in a few days the accommodation was better. I think we should inquire as to the drugs that have been taken in these cases.

DR. J. P. WORRELL, Terre Haute, Ind.—I have at the present time a lady patient who has a deficient range of accommodation on one side. She is unable to use her eyes for reading and sewing. I found the manifest hypermetropia was greater upon the side on which the near point was the more remote, but a careful study under mydriatics showed there was no difference in the refraction. When the total hypermetropia was corrected and the accommodation was restored the near point in the affected eye remained more remote than in the other eye. I have attempted to correct this disparity by giving a stronger glass for reading on that side. This plan has been successful in this case, but I would like to know what is the experience of the gentlemen in the use of reading glasses stronger on one side than the other in cases in which the refraction is the same. I feel like commending the views of Dr. Hotz as to the impropriety of calling this paralysis. The eye shows no evidence of paralytic changes. The condition may be one of diminished muscular power, or one of increased resistance to be overcome.

DR. H. H. BROWN, Chicago.—I have very much enjoyed the paper of Dr. Suker. I feel that Dr. Alt made a very important statement when he takes issue on the necessity of pharyngeal

involvement. I have a case, a daughter of a physician, a characteristic case, which came to me with complete paresis of the accommodation. She had been in school constantly until the time of isolation made necessary by the out-break of diphtheria in the family, at which time an adult member of the family died. The little girl was the picture of health and had no evidence of pharyngeal involvement. The paresis was as complete as any I have ever seen. The father being an intelligent physician, and the death of one member of the family giving every reason for care on his part, I am quite sure there was no pharyngeal involvement.

DR. EDWARD B. HECKEL, Pittsburg.—I wish to put myself on record as being of the same opinion as Dr. Alt, namely that a non-diphtheritic tonsilitis may be followed by a paralysis of accommodation. I have seen several cases where diphtheria could not be demonstrated. In seeking for a cause it is often difficult to arrive at a definite conclusion. In the use of drugs, as mentioned by Dr. Gamble, interesting problems arise. I once had a woman with a complete paralysis of accommodation without any apparent cause. She denied having used any drugs for a long time, but upon a closer inquiry I ascertained that she had been using a liniment on her husband. I obtained a copy of the prescription and found that it contained 2 dr. of fluid extract of Belladonna to a 3 oz. mixture. She had absorbed sufficient Belladonna through the skin of her hands to produce a paralysis of accommodation, which promptly disappeared after a discontinuance of the administration of the liniment. Paralysis not infrequently follows the use of a Belladonna plaster. I believe local paralyses are often due to a disturbance of the eliminative functions. In diabetics, I have seen a paralysis of the sixth nerve followed by a complete paralysis of all the third nerve muscles, and all of which made a complete recovery after the use of Carlsbad salt, which simply increased the eliminative functions and removed the toxic elements. The paralysis we see in hysteria, I believe are due to a faulty elimination, brought about by a physical disturbance of the normal functions and are toxic in character.

DR. ADOLF ALT.—Dr. Brown misunderstood me. I did not say I had ever seen paralysis of accommodation without pharyngeal involvement. I said that it is sometimes impossible to dis-



cover diphtheritic involvement in a sore throat. Yet a paralysis of the accommodation follows. Since the drug question has been brought up I wish to add an instance from my experience. A young gentleman rushed into my office with the exclamation: "O, Doctor, help me, I am going blind suddenly. If you cannot, I shall kill myself." After I had quieted him, I found he had paralysis of the sphincter pupillæ and ciliary muscle in both eyes. Careful inquiry finally elicited the fact that he had used a patent suppository which contained Belladonna for the cure of hæmorrhoids. The recovery was, of course, a speedy one.

DR. REYNOLDS.—I would like Dr. Suker to give the distinction between *paresis*, which is central and *paralysis*, which is peripheral.

DR. SUKER (closing discussion).—I am not in the habit of taking issue with Dr. Brown, but I did say in my paper that it was not necessary to have diphtheria in the throat in order to have the paresis of accommodation, but that the diphtheria might be located anywhere. Although we might make 50 slides without demonstrating the bacillus, we still might have a mixed infection, or a diphtheritic involvement of very low grade. In such a case the bacillus might not assume its characteristic form. In reply to Dr. Hotz I will read a distinction I have made in a foot note, which will answer Dr. Reynolds at the same time. "Paralysis is the suspension or abolition of functional power, especially in the nervous system, in which case there is a temporary or permanent loss of the power of motion or sensation, or both, in the part supplied by the affected nerve. Paresis is an incomplete paralysis, especially when not associated with any demonstrable organic lesion—limited to motion and not to sensation." I said there were two varieties, myopathic and neuropathic. The myopathic can follow general muscular enfeeblement which usually happens in such diseases as typhoid, malaria, etc. In any muscle which is exhausted the effete materials accumulate and we have an exhaustion paresis. The nerve force may still be there, but the muscle incompetent to respond to the nerve impulse.

The reason our pupils are so near the nasal side is because we are creatures of evolution. If we live long enough we will find the pupil at the tip of the nose, as has once been said by my friend, Dr. Wood. The center or the muscle of accom-

modation is separate from the iris contraction center in the third nerve nucleus. Any one can by practice suspend the accommodation in one eye and maintain it in the other. My assistant has noticed it in my own accommodation, while using the ophthalmoscope. The same may be said of the iris motility. The main fact is that we have a separate center for the muscle of accommodation and the muscle for iris contraction in the third nerve nucleus. It has been proven that they are separate.

As to palliative glasses, I merely wish to help out and comfort the patient for the time being, as it may be a business man whom I want to tide over his difficulty.

The symptoms of a peripheral or central paralysis or paresis are practically the same. To determine whether it is a central or a peripheral lesion depends mainly upon the fact whether the act of accommodation alone is involved or whether it is associated with mydriasis or the involvement of other muscles supplied by the third nerve. If more than the accommodation is involved, excluding mydriatics, the chances are that there is a central lesion, for the simple reason that all these centers are so intimately connected that in a nuclear lesion it would be nigh to impossible for one to be affected and not the other.

## FUSION TUBES AND THEIR USE FOR STRABISMUS.

BY EDWARD JACKSON, M. D.,

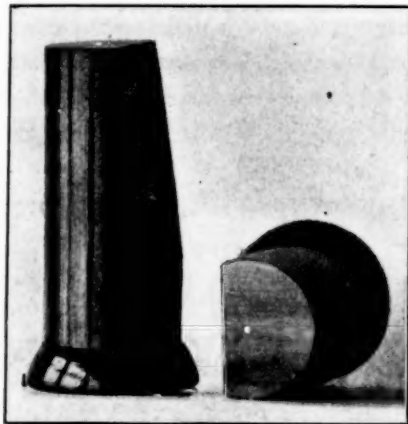
DENVER, COLORADO.

IN his Bowman lecture on the "Etiology and Educative Treatment of Convergent Strabismus" in 1898, Priestly Smith described the fusion tubes, and the different ways in which he employed them. The form which he called the "heteroscope," in which the two tubes are suspended in a kind of a hood, is convenient for measuring the amount of convergence or divergence. But for actual work in the educative treatment of strabismus it is not sufficiently flexible. It is not adapted to different widths between the pupils, and the movements that can be executed with it are only those of convergence and divergence.

There is some advantage in having the tubes adaptable to the distance between the pupils, and the patient takes more

interest in the exercises, and his interest continues longer when he is able to move the tubes with greater freedom. The exercises of fusing vertically displaced images, and rotated images, sometimes bear more directly on the deviation than do the exercises of divergence and convergence. Furthermore, these different exercises of fusion are of some value in all cases that require the developing of the fusion faculty.

For these reasons I have the tubes made, the one entirely independent of the other. One end of the tube is closed by a metal diaphragm, in which is a minute hole and a narrow slit. At the other end of the tube is placed a convex lens, having its principal focus at the diaphragm. One side of the tube is cut away or flattened, so that the slits can be brought almost together. This allows fusion when the normal axes converge to a point as close as three inches from the eyes. The tubes, as made by Paul Weis of Denver, are shown in the accompanying figure.



With these tubes a person with emmetropia, or corrected ametropia, holding one before each eye sees the hole as a light dot, and the slit as a light line, most distinctly without any effort of accommodation. When they are held with the flattened sides of the tubes toward each other, one who has the power of binocular fusion can fuse the two lines or the two dots, but cannot fuse both the lines and the dots at once. When a patient looks through them, if he sees only one dot and one line he is seeing with but one eye. If he sees two

dots and two lines, he is seeing with both eyes, but is not fusing the two images. If he sees one line and two dots, he is seeing with both eyes and fusing the images. He is exercising the power of normal binocular fusion. The same is true when one dot and two lines are seen. When the acuteness of vision is much better in one eye than in the other, the brightness of the line and dot seen by the better eye may be diminished by pasting over the hole and slit before that eye one or more thicknesses of paper.

In general the exercises begin by securing binocular fusion. When this has been done, so that the one line and two dots are seen, the tubes are moved as far as is possible without a separation of the images. That is, the power of fusion is made to guide and control the ocular movements. For a convergent strabismus the principal movement would be to diminish the convergence of the tubes. For divergent strabismus, to diminish their divergence. For vertical strabismus, to bring the tubes into the same plane. In each case the tubes are brought toward parallelism. For rotary deviation (cyclotropia), fusion would be obtained when the slit of the tube before the deviating eye is not parallel to the slit in the other tube. The movement then would be to bring the two slits toward parallelism.

But all these movements are valuable in training the power of binocular fusion and giving it control of the ocular movements, and this is a very important purpose of such exercises in all cases of strabismus, except those due to ocular paralysis occurring after the power of binocular fusion has been well established. Hence, in each case these various movements will all be of service. The tubes may also be very useful before any faculty of binocular fusion is developed. In teaching the child to see with both eyes at once, and to pay attention to the images which both furnish, the tubes may be turned so that the lines appear parallel in an oblique position, cross at right angles, join at the top or bottom, etc. Every combination in which images formed on the two retinas are in any way connected in the act of vision will prove of value. The variety and freedom of such exercises prevent them from becoming so quickly distasteful, as do the more fixed exercises of the amblyoscope and stereoscope.

## THE TEACHING OF OPHTHALMOLOGY IN CHINA.

BY CHARLES A. OLIVER, A. M., M. D.,

PHILADELPHIA, PENN.

SEVERAL years ago, through the kindness of Dr. Joseph Price of this city, Dr. and Mrs. J. B. Fearn of Soochow, China, came under my tuition at the clinics of Wills' Hospital, in the eye wards at Philadelphia Hospital, and in one of my private classes. Dr. and Mrs. Fearn were at work with me daily for several months' time, and were earnest and painstaking students, acquiring a great deal of the theoretical knowledge which was so necessary for an adequate comprehension of their clinical findings, and becoming expert in much of the practical part of the work. They also gained a broad and comprehensive view of the literary portion of the subject through constant reading, and I felt sure that they returned to their home well equipped to practice and teach some of our Western ideas regarding the art and science of ophthalmology:

I received a few brief letters stating that the doctor and his wife had arrived at the field of their labors and had begun work, but it was not until a few days ago, when I received the following letter, had I any idea to what extent and to what good purpose they had applied their knowledge.

"Soochow, China, April 7th, 1903.

"DEAR DR. OLIVER:

"It has indeed been a long time since I have written you. We have been kept very busy this year. My fellow worker has gone home, and so Mrs. Fearn and I are by ourselves. We have had some very interesting cases.

"I suppose you know that we have a medical school in connection with our two hospitals, at which place we endeavor to teach the young men and women of China something of our healing art. Just at present I am trying to give them some idea of the eye and its diseases. We teach in English and Chinese both. The lecture is written in English, each student making a copy; it is then given in Chinese, the English being explained. All of our students are required to understand some English. We are raising the standard of our course each year. I send you the answers to my first



examination by one of the students; he gave us all of his in English. I am compelled to ask the questions in rather a round about way so that the students can understand. I want you to pass judgment upon this paper. You will see from the examination that I have not yet gotten to the consideration of diseases of the cornea, the iris and the deeper portions of the eye. This paper is just as the young man gave it to me. You will excuse his grammar, as he has never studied it as a special branch—only picking it up from his other studies. His idiom is rather poor in places. This part of the work is to me the most interesting. We have hopes of multiplying our good work by thus teaching others.

"I have to thank you for my knowledge of the practical work in ophthalmology. I never can forget how kind you were to me. I hope in some way to show this to you. I feel as though the best way to have you know my appreciation is to pass your teaching on to others. I wish you could visit us in our home here; we would give you some interesting eye clinics. I suppose you know that Dr. Mary Fitch is also in Soochow. I see her from time to time and we often speak of the evenings at your home. Dr. Jeffries is in Shanghai. He is now hard at work, which I am sure will bear good results, as he has had excellent preparation. I saw him some time ago for a short while. Unfortunately, however, we are so busy that we get but little time to seek any social life or pleasure.

"If you have time let me hear from you. Mrs. Fearn joins me in kindest regards.

"Sincerely,

J. B. FEARN."

The questions noted in the letter are as follows:

"EXAMINATION ON THE EYE, No. 1.

1. How does the blood reach the eye, and how does the blood leave the eye?
2. Name the tunics of the eye in order. Describe the cornea.
3. Describe the iris and the retina.
4. Describe the crystalline lens.
5. Describe the conjunctiva.

6. Describe the course of the tears.
7. Give symptoms and treatment of acute catarrhal conjunctivitis.
8. Give treatment and prophylaxis in purulent conjunctivitis.
9. Give treatment of injuries and burns of the eye.
10. What is the treatment of trachoma?
11. Give reasons for use of hot and cold compresses in eye diseases."

The answers, with all the errors of construction, punctuation and spelling (being copied from the very sheets which were used by the student, Woo), although uncertain in many respects and capable of provoking much adverse criticism, are herewith given in every detail, in order that the reader may see to what a remarkable degree of certainty of knowledge the Chinese student of to-day has advanced.

"1. The blood supply the entire eye comes from the Ophthalmic Artery. This artery reach the eye through the most important opening, which is called the optic foramen. This foramen is at the apex of the bony cavity. The blood leave the eye from the Superior and Inferior Ophthalmic veins. These veins going out from the eye socket through the next important opening which is called the superior orbital fissure.

"2. The tunics of the eye are three—1, Sclerotic and Cornea. 2, Choroid, Iris and Ciliary processes. 3, The Retina. The cornea is transparent projecting part of the external tunic of the eyeball. Its degree of curvature varies in different ages and people. It is more prominent in youth. The cornea is formed of four layers—1, Several strata of epithelial cells continuous with those of conjunctiva. 2, Cornea proper. 3, An elastic layer. 4, A single layer of epithelial cells. The third and fourth layers combined are called the membrane of Descemet. The cornea is nonvascular but is full of nerves.

"3. The iris are muscular circular curtains behind the cornea. It has a hole in its centre called the Pupil. The iris is very contractile. The iris suspended in the aqueous humor and forms the division of the anterior and posterior chambers. The iris are connected at its circumference to the

choroid and cornea. The iris at its pupillary margin is in contact with the crystalline lens, so it causes fastens to the lens in Iritis.

“Retina is a delicate nerve membrane, upon the surface of which the images of external objects are received. The retina is the outspreading ends of the optic nerve. Exactly back of the pupil, at the posterior surface of the retina, there is a round yellow spot, called yellow spot or Macula Lutea. At this point the sense of vision is most acute.

“4. The crystalline lens enclosed in its capsule just behind the iris. It is a transparent double convex body. In fœtus it is nearly round, but in adult life it becomes more flattened, and in old age it becomes quite flat. It is not so transparent in old age than in youth. The capsule of the lens fits close around the lens. The crystalline lens retained in its place by the suspensory ligament; the Hyloid membrane.

“5. Conjunctiva is the mucus membrane of the eye. It lines the inner surface of the lids and continuous onto the eyeball. It covers the anterior part of the cornea and sclerotic. The conjunctiva lines the inner surface of the lids are thick and very vascular and covered with numerous papillæ which cause hypertrophy in Trachoma. The part over the Sclerotic is thinner, and over the cornea is very thin. The conjunctiva over the Sclerotic is slight vascular in health. The nerves are numerous in conjunctiva.

“6. The tears secret from the lacrymal gland, this gland is at the outer upper angle of the eye and is in a depression. It secret the tears to keep the eye moist. After passing from the surface of the eye, it flows out through the punctum and into the lacrymal canal and on into the lacrymal sac and into the nasal duct and into the nasal cavity,

“7. Symptoms. Subject. 1, Increased lacrymation. 2, Photophobia. 3, Burning and itching. If there is pain, the cornea perhaps involved. The sensation of sand in eye is produced by flakes of mucus which swept over the sensitive cornea. The flakes of mucous often temporarily obscure vision, all these symptoms are worse at night. Objective symptoms. 1, redness, relaxation, and swelling. 2, Increased of secretions with or without change in its character. The con-

gest is very great, is easily distinguished them one from another. These symptoms usually confined to the conjunctiva of Tarsi, and fornici, but in severe forms it involved the whole parts of the conjunctiva.

"Treatment. 1, Remove the cause. 2, Abort or control the attack. 3, Prevent it running into chronic form. Glasses should be fitted. The interior of the eye should be examined. Applications of silver nitrate solution, the strength is usually one per cent (5 grains to one ounce). This application should be preceded by a thorough washing of the conjunctival sac with a solution of Boracic Acid (10 grains to one ounce). Absorbant cotton wound upon an applicator and dipped into the solution, care having been taken to remove any excess of the solution from the swab. The lid everted and touched. The manner of application is even more important than the strength of the solution. If the eye be thoroughly clean a ten grain solution should be passed lightly two or three times with a cotton swab freshly charged each time. The effect is good. If done carelessly there is very little good. The immediate result of an application to the lid, is increasing of the symptoms. A slough form usually thrown off with half an hour or longer. Then it turns white which lasts a day and is followed by the stage of recrudence which is an indication of a fresh application. Silver should not be applied at night, for the lids are closed and the exudate does not escape but lying in the sac during the night and dry upon the lids and cause new trouble. It also should not apply too often as the inflammation will be increased. The inflammatory exudate present in the tissues underneath should thus be allowed to escape. When the severe symptoms subside, use boracic acid solution. If the cornea is broken, do not use lead solution. Peroxide of Hydrogen 25 per cent used as the same was as silver.

"8. Treatment. The most important point of the treatment is to washing away all the discharge from the eye, especially when the disease pass into the stage of purulent discharge. The most used for washing out the eye (in this trouble) a solution of Boracic acid. The object aimed at is not destruction the poison in the sac but to remove of the poison, so this solution is best. A rubber bulb with a glass

pipete is best instrument for washing out the eye. The point of glass pipete should very smooth and inserted at the outer canthus of the eye and forcing the cleansing solution to the sac. The bulb should hold as much as two ounces. After washing the pipete put in antiseptic solution to disinfect it.

“This washing should be every hour or as oftener as the discharge may demand. At the time the discharge cannot be washing away. Use a small bit of absorbant cotton, take away all the discharge without much wiping. If the swelling are so great, constantly applying of cloth wrung out with cold water. It is not good in weak patients and the eye should be watched very carefully in such cases. The cornea should be watched. If the cornea grows hazy the cold is does not fit for him should be stopped at once. The swelling grows less and the discharge very purulent, the cold is not of much use. If seen early the course may be cut short by an application of Silver Nitrate Solution. When during the periods of watery and the great intense of lids, the silver must not repeat. When the discharge is purulent a solution of 2-4 per cent of silver nitrate or a 20-40 per cent solution of protargol should be used. Everted the lids and apply on the surface of the conjunctiva, once a day or as the case indicate. Silver should not make the second application when the conjunctiva looks raw and red but wait till the conjunctiva assumes its succulent appearance. Canthotomy performed at the times of the lid are so swelling that it is impossible for a free cleansing or from pressure of lid so much. In child the upper lid may be divided.

“The general treatment is to rest on bed till the swelling and discharge begin to grow less. Internally begin with a dose of free laxative or cathartics, afterward give quinine or tincture of chloride of iron, the latter in full doses. If the patient weak or run down, other tonics or stimulants may be given as the case indicate. Prophylaxes—As important as treatment. For in adults usually but one eye is affected at first. The other eye should be with great care to prevent it from being infected. Use a pad of linen put over the lid, over this a pad of absorbant cotton, both held down by colodion paint around the edges, or use the adhesive plaster to



fasten the edge of these pads to the skin. The best way is to use a large watch glass put over the good eye and fasten the margins with strips of adhesive plaster. This way has been done, the patient can get about or examine the eye. A small opening left at the temporal side to allow the air to circulate. At birth usually both eyes are affected, but also should be prevented. When you think the child is infected, use a 2 per cent solution of Nitrate of Silver to clean the eye. It is so common, so is better washing out every new born baby with the Solution of Silver Nitrate. You should very careful to examine the eyes of every new born baby if there is an appearance of little redness.

"9. Treatment of Injury. Washing out the conjunctival sac to remove the foreign bodies from the eye and keep the eye clean until well. Burns of the eye may be treated by washing the conjunctival sac with milk. If burns by lime, be first wash the eye with oil, then a saturated solution of Sugar, one drop put into the eye. Cold compress relieve pain. It is hard to prevent symblepharon.

"10. No treatment seems to do much good in a great many cases. In the early stage before the granule developed sufficiently, to be sure of your diagnosis, an application of Silver nitrate may be used. When these granules can be seen as hidden under the thickened lid or the conjunctiva, the recovery may be quicker by mechanically pressing out these granules. This may be done by thumb nail, to catching the thickened lids or its inside between the two nails forcing out all the granules that can be removed from the tissue. Best instrument for this purpose is known as Knapp's roller forceps which will take away these granules quite nicely. An anæsthetic should be used in painful cases. In a few patients this treatment can be cured them without further treatment. But in large number of patients only hastens the recovery which should be brought about by a astringent applications faithfully applied as long as necessary. Remove these granules by scraping or cutting has been done, but this treatment usually leaves large scars and cause lid deformity. When there are few or no granules, the astringent application may be relied upon. The best drug for this astringent application is Copper Sulphate (Blue stone). In severe cases this appli-

cation should do every day but usually every second and third day will do. Next the Sulphate of Copper is a solution of Tannin in glycerine (8 per cent. one drachm to a fluid ounce). It is more useful when the discharge grows less or the conjunctiva is smoother. It should be applied on the everted lids. A solution of iodine apply to the everted lids sometimes are good. A solution of 1-500 or even stronger of Bichloride of mercury may give relief but is very painful.

“For dispensary work when a patient is treated at home, a weak solution of Sulphate of Copper in glycerine ( $\frac{1}{4}$  or  $\frac{1}{8}$  of one per cent.) or ( $\frac{1}{2}$ -1 grain to the fluid ounce) or solution of tannin in glycerine are good remedies. When there is pannus or the granules are indolent, hot compresses form a fine stimulant. In addition to the strong application the eye should be kept clean. Use atropin when necessary. The presence of any discharge use a weak solution of Bichloride of mercury or Solution of Boric Acid. If it becomes chronic see if the patient does not need glasses. If there is lid deformity an operation should be performed.

(Signed) LEE YOONG WOO.”

Ignoring the way in which the answers are put (a mere question of language, and one in which many of our own students would be equally at fault in even modern French and German, let alone Chinese), I offer them as a sample of the effects of the good work which is being done by the medical men and women of our country who have voluntarily placed themselves in the midst of strange and, at times, uncertain people.

In this letter and its contents I find an illustration of the great service which is being rendered to another nation in lessening the amount of its ophthalmic diseases and in decreasing the number of its blind.

## MEDICAL SOCIETIES.

### PROCEEDINGS OF THE OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.\*

W. LANG, F.R.C.S., President, in the Chair.

*Thursday, June 11th, 1903.*

#### SUBCONJUNCTIVAL FISTULA FORMATION IN THE TREATMENT OF CHRONIC GLAUCOMA.

MAJOR HERBERT, I.M.S., described how this could be done either by producing a subconjunctival prolapse of the iris or by infolding the conjunctiva. The report dealt with 130 cases in which the iris was left prolapsed under a conjunctival flap, and in all but 18 eyes a small iridectomy was added. A large number of these eyes were in an advanced stage of the disease, and were therefore not very hopeful when an iridectomy only was done. For this reason a large incision was dangerous. The visual results of operations done from six months to upwards of three years previously were given. Only one eye had suffered from late infection, and this gave way rapidly to treatment. In two eyes there was iridocyclitis immediately following the operation. In one case it caused partial occlusion of the pupil, and in the other, which was somewhat neglected, it led to sympathetic ophthalmia, with total loss of both eyes. The sight of another was lost through protracted delay in filling of the anterior chamber. These serious early complications were less numerous than when simple iridectomy was done. It was claimed that a filtering cicatrix could be obtained with certainty, and that in some cases this was the only way to relieve the tension. At any rate, the risk was far less than if the tension was not relieved by the iridectomy. On the whole, the visual results were much better than could have been expected from typical iridectomy. Many cases of so-called atrophy of the optic nerve after operation were in reality due to unrelieved tension. A fistulous cicatrix was indicated (1) when iridectomy had already failed, (2) where it was likely to fail such as in ad-

\*British Medical Journal.

vanced cases, and (3) when the patient was not expected to return for a second operation if one was required. The danger to the other eye was very remote and would probably yield to mercurial treatment or enucleation. The connection of the iris with the prolapse could, if desired, be severed by a subconjunctival sclerotomy, cutting up through the attached base of the iris. The second method by a subconjunctival infolding into a small sclerotomy wound had proved effective in a number of cases. The aim was to establish a fistula unconnected with the uveal tract. By a special suture the flap could be kept in place long enough to keep separate the lips of the wound so as to form a permanent subconjunctival fistulous track. The 10 cases in which this was done were of too recent date to give a correct appreciation of its value. Other successful cases of conjunctival infolding without suture had been under observation for periods up to nearly two years. Many other attempts, however, failed to relieve tension through the flap not remaining infolded long enough; and in one eye the tension was far too much reduced. Apparently infective mild iritis came on and eventually detachment of the retina. Twenty-three operations were performed without suture, or with imperfect suture.

MR. PRIESTLEY SMITH, MR. TREACHER COLLINS and Sir ANDERSON CRITCHETT made remarks; and Major HERBERT briefly replied.

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*Friday, July 3rd, 1903.*

KERATITIS, WITH SPECIAL REFERENCE TO THE PART PLAYED  
BY THE CORNEAL CELLS.

DR. LESLIE BUCHANAN gave a lantern demonstration of sections of the cornea, showing the changes following injury and disease. Proliferation of corneal corpuscles appeared to take a larger share in the production of new cells than exudations from the vessels of the limbus. Sections of the normal cornea showed a more liberal distribution of corneal corpuscles in the anterior layers than in those further back. In inflamed areas budding of nuclei could be demonstrated, and this in advanced cases amounted to complete fragmentation of the original nucleus, the new nuclei being traceable

along channels between the corneal fibres, presumably in the course of lymph currents. In other instances fibrillation of the corneal fibres and separation of the elements by œdema was manifest.

#### PRIMARY PAPILLOMA OF THE CORNEA.

MR. C. W. DEAN reported a case. After pointing out the extreme rarity of the condition, he stated that the patient was a fisherman, aged 53, who was first seen in August, 1901. There was a tumor growing from the inner side of the left cornea. It had existed for about four years, and had commenced as a minute speck on the "clear" part of the eye, and it had gradually grown, principally toward the pupil. On August 30th the growth was the size of a flattened pea, and whitish in appearance. It was situated at the lower and inner quadrant of the cornea, to which it was closely adherent. It slightly overlapped the conjunctiva. Some fine posterior synechiæ were present. Left vision was J. 14. Mr. Bickerton removed the tumor, and the patient made a rapid recovery. In November the vision was  $\frac{6}{6}$  and J. 2. The examination of the tumor showed it to be a papilloma, with much heaping up of horny epidermis. The site of the tumor was now hardly visible.

#### PLEXIFORM NEUROMA (ELEPHANTIASIS NEUROMATOSA) OF TEMPORAL REGION, ORBIT, EYELID AND EYEBALL.

MR. SIMEON SNELL (Sheffield) related three cases:

The first was a lady aged 25, in which the deformity affected chiefly the right upper lid, but involved also the lower eyelid and the tissues of the temporal region. The condition was congenital, but had gradually increased. Considerable improvement in appearance was effected by removal of the much thickened tissue. Case II was a youth, aged 19. He had been first seen as a baby and again five years ago. The condition was congenital, and the deformity was very great and affected the left upper eyelid, the temporal region, and side of face and orbit. The mucous membrane of the left alveolus and left side of the palate was also implicated; the eyeball was shrunken and small. The orbit was greatly enlarged, and at its outer side was felt a thickened mass in the situation of the lachrymal gland. Two operations were per-



formed for removal of the thickened tissues from the orbit, eyelids and the integument of the temporo-facial region with considerable improvement in appearance. Case III was a boy, aged 7. The condition affected the left eyelids, the temporal region and the orbit; the eye was buphthalmic. It was congenital, but had gradually increased, especially latterly. The globe was enucleated, and on two occasions large portions of the thickened tissues were excised. In all three cases the tissues were dense and contained numerous cells and thick threads. Bleeding was very free.

The histological examination of the second and third cases was presented by Mr. Treacher Collins. He had found that the skin in both cases showed thickening of the corium but no inflammatory infiltration. In the subcutaneous tissue numerous sections of nerves were seen cut in various directions; there was marked thickening of the connective tissue elements in both perineurium and endoneurium. Sections stained by Weigert's method showed the nerve fibres in the center of these masses of thickened fibrous tissue. Examination of the buphthalmic eye from the third case showed enlargement and thickening of the fibrous tissue of the nerves, external to the sclerotic, and lying in the sclerotic. The nerves of the cornea and uveal tract were enlarged, and there was a congenital adhesion of the iris to the cornea, with a failure in development of the ligamentum pectinatum. This accounted for the increased tension and subsequent enlargement of the globe.

MR. SNELL remarked that the literature of the cases was not very extensive. He referred to Alexis Thomson's monograph in which 58 cases of plexiform neuroma in different parts of the body were collected. Out of this number were 18 in which the eyelids, forehead and temple were affected, but there was no reference to implication of the orbit.

#### CARD SPECIMENS.

The following were shown: Dr. Leslie Buchanan: (1) A specimen of an eye which was quite healthy previous to an injury ten weeks before but which then suppurated, and on removal contained bone in the shrivelled stump; (2) a case of keratomycosis. Messrs. W. C. Rockcliffe and L. H. Parsons: Plexiform neuroma.

## ABSTRACTS FROM MEDICAL LITERATURE.

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### SOME TYPES OF RETINITIS AND CHORIO-RETINITIS.

Alexander Duane (*Medical News*, March 21) discusses the following types:

1. *Exudative Chorio-retinitis*.—Occurring, usually in young people and often without apparent cause, acute onset, running a rapid course, marked by the presence of single, circumscribed exudate situated, usually, not very far from the optic disc, often associated with considerable edema and milkiness of the surrounding retina, and impairment of vision if the exudate is located in region of the macula. The salicylates, calomel in broken doses and rest in bed seems to be the best treatment. The prognosis is generally favorable.

2. *Plastic Chorio-retinitis*.—Characterized by sharply defined whitish aggregations of connective tissue, which may be sunk in the choroid or retina, or may project into the vitreous, even as far as the lens or the ciliary body; attributable to organization taking place in the vitreous exudate. This may develop in conjunction with disseminated choroiditis or may accompany a retinitis, in which case they often originate in a patch of hemorrhage. At times they probably occur as a result of a hemorrhage without inflammation of either the choroid or the retina. These plastic products are apt to remain unchanged for years, though the milder forms may be capable of absorption. Mercury and the iodides seem to be the best treatment. The second form mentioned is retinitis circinata, of which the author reports an atypical case.

### THE GIANT MAGNET IN OPHTHALMIC SURGERY.

Leartus Conner (*The Journal of the American Medical Association*, March, 21) reports two cases in which the giant magnet was successfully used, in one of which a small magnet had failed. Both cases recovered with some vision and a slightly disfigured eye. The author feels that had it not been

for the giant magnet an enucleation would have been necessary in both cases. He says:

“The technique of extraction of splinters from the vitreous chamber is far from being as simple as might appear. The most experienced are still learning, and beginners do well to heed their suggestions. The great power of the giant magnet renders it capable of irreparable harm if wrongly directed, or infinite good if rightly.

“The experimental work, added to the clinical evidence of numerous observers, combines to show that at contact and up to two mm. the power of the small magnet equals, if not surpasses, the giant, but from this distance to 10 mm. the power of the giant increases in almost geometric ratio. From this fact it is clear that the small magnet is suited only to such cases as admit of its point being brought in direct contact with the splinter, while the remaining cases are clearly within the domain of the giant magnet. Under this view of the case most, if not all, splinters in the vitreous should be extracted with the giant magnet, and not a few in the aqueous chamber.

“Experiment and observation show that the farther the magnet is from the splinter the more uniform the action of its force, and the nearer the more jerky such force—the stronger the magnet the more marked this law. It follows that in practice it is wise to either (1) bring the eye close to the magnet point ere starting the current and increase its power very slowly, or (2) bring the eye from a considerable distance toward the point of the magnet with full current very gradually. The jerky force is liable to draw the splinter into the ciliary body, whence it is removed with difficulty, if at all, or it may draw it into some other undesirable location. To rectify this state of the splinter Dr. Kipp has shown us how to utilize the other tip of the magnet to repel the splinter from its misadventure, or course; this calls for a double-ended magnet. In his case the splinter fixed itself firmly in the ciliary body, and no change in direction of the magnetic force would dislodge it. He reversed the pole, when the splinter was released and readily removed. Possibly had this fact been known many failures would have been avoided, as even Haab reports failure from this cause.

“Haab so places his magnet that the force shall pass directly through the center of the cornea, expecting the splinter to approach the posterior pole of the lens, curve around its posterior surface, penetrate the suspensory ligament, enter aqueous chamber, pass between the posterior surface of the iris and anterior surface of lens to the pupillary opening, whence it is extracted by a conveniently located corneal incision. In cases like those reported, where the wound in the cornea is large and freshly made, a new corneal incision is superfluous and the placing of the magnetic current over the fresh wound more desirable. Doubtless other cases will make it desirable to depart from Haab's rule.

“Since 1892 to June, 1902, Haab reports 165 operations with the giant magnet. Of these 23 failed; 39 eyes were enucleated; 9 had lingering cyclitis; 19 were saved from inflammation, but were sightless. Of 71 cataracts extracted, 51 had good vision.

“His failure to extract the foreign body he lays to four causes: 1. A firm fixation of the splinter in the posterior wall of the eyeball (emphasis to be placed on the “firm,” as in other cases the splinter was extracted from the same location); 2. firm fixation of the splinter in the ciliary body; 3. splinter held by a fibrinous exudate; 4. a splinter healed over in the lapse of months.”

#### TRICHLORACETIC ACID TREATMENT OF INFECTIVE ULCERS OF THE CORNEA.

Albert E. Bulson, Jr. (*Ophthalmic Record*, February) reports two cases. He thinks that in ulcer of the cornea, no matter what the character of the infection, treatment with trichloroacetic acid is superior to pure carbolic acid or any other caustic with which he is familiar, and is much safer than the thermo or galvano cautery.